

### Course Outcome for B.E. Information Technology

Class	Semester	Name of the Subject	CO	Course Outcome
FE	I	Physics	822101.1	To study Bragg's Law and introduced to the principles of lasers, types of lasers and applications
			822101.2	Various terms related to properties of materials such as, permeability, polarization, etc.
			822101.3	Some of the basic laws related to quantum mechanics as well as magnetic and dielectric
			822101.4	properties of materials
			822101.5	Simple quantum mechanics calculations
			822101.6	Nanotechnology and their industrial applications.
FE	I	Mathematics - I	822102.1	Apply differential and integral calculus. Apart from some other applications they will have a basic understanding of Beta and Gamma functions.
			822102.2	The fallouts of Rolle's Theorem that is fundamental to application of analysis to Engineering problems.
			822102.3	The tool of Fourier series for learning advanced Engineering Mathematics.
			822102.4	To deal with functions of several variables that are essential in most branches of Engineering. The essential tool of matrices and linear algebra in a comprehensive manner.
FE	I	Basic Electrical & Electronics Engineering	822103.1	Students will be able to demonstrate knowledge of circuit analysis using various basic laws and theorems of electrical circuits
			822103.2	Students will be able to demonstrate and understand definition and relationship of various AC circuits.
			822103.3	Understand working principle of PN junction diode, Zener diode and their applications.
			822103.4	Describe different configuration of Bipolar Junction Transistor.
			822103.5	Describe different configurations of FET
			822103.6	Understand operating principle Power Electronics Devices

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			822103.7	Describe use of the Basic gate and Universal gate
FE	I	Programming for Problem Solving	822104.1	To formulate simple algorithms for arithmetic and logical problems
			822104.2	Understand the fundamentals of C programming.
			822104.3	To test and execute the programs and correct syntax and logical errors
			822104.4	Choose the loops and decision making statements to solve the problem.
			822104.5	To decompose a problem into functions and synthesize a complete program using divide and conquer approach
			822104.6	To use arrays, pointers and structures to formulate algorithms and programs
FE	I	Physics Lab	822105.1	To study Bragg's Law and introduced to the principles of lasers, types of lasers and applications
			822105.2	Various terms related to properties of materials such as, permeability, polarization, etc.
			822105.3	Some of the basic laws related to quantum mechanics as well as magnetic and dielectric
			822105.4	properties of materials
			822105.5	Simple quantum mechanics calculations
			822105.6	Nanotechnology and their industrial applications.
FE	I	Basic Electrical and Electronics Engineering Lab.	822106.1	Identify electrical and electronics components/equipments.
			822106.2	Simplify D.C. network using Superposition Theorem.
			822106.3	Simplify D.C. network using Thevenin's Theorem.
			822106.4	Learn diode V-I Characteristic
			822106.5	Understand BJJ as a switch
			822106.6	Understand LED, JFET, SCR V-I characteristics

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FE-IT	I	Programming for Problem Solving Lab	822107.1	Understand the fundamentals of C programming.
			822107.2	Choose the loops and decision making statements to solve the problem.
			822107.3	Use functions to solve the given problem.
			822107.4	Implement different Operations on arrays.
			822107.5	Understand strings and structures.
			822107.6	Understand the usage of pointers.
FE	II	Chemistry	822201.1	Analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.
			822201.2	Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques
			822201.3	Rationalise periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity.
			822201.4	Rationalise bulk properties & processes using thermodynamic considerations
			822201.5	List major chemical reactions that are used in the synthesis of molecules.
FE	II	Engineering Graphics	822203.1	Introduction to engineering design and its place in society
			822203.2	Exposure to the visual aspects of engineering design
			822203.3	Exposure to engineering graphics standards
			822203.4	Exposure to solid modeling.
FE	II	English	822204.1	To acquire basic proficiency in English including reading and listening
			822204.2	To demonstrate proficiency in the use of written English, including proper spelling, Grammar and punctuation.
			822204.3	To enhance their ability to use spoken words in interpersonal communication, small group interactions and public speaking Comprehension, writing and speaking skills.
			822204.4	Become accomplished technical communicators.
FE	II	Mathematics-II	822202.1	Use mathematical tools needed in evaluating multiple integrals and their usage.

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			822202.2	Apply effective mathematical tools for the solutions of differential equations that model physical processes.
			822202.3	Use tools of differentiation and integration of functions of a complex variable that are used in various techniques dealing engineering problems.
FE	II	Chemistry Lab	822206.1	Upon successful completion of lab Course, student will be able to: The chemistry laboratory course will consist of experiments illustrating the principles of chemistry relevant to the study of science and engineering. The students will learn to:
			822206.2	Estimate rate constants of reactions from concentration of reactants/products as a function of time
			822206.3	Measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of water, etc
			822206.4	Synthesize a small drug molecule and analyse a salt sample .
FE	II	Engineering Graphics Lab	822207.1	Introduction to engineering design and its place in society
			822207.2	Exposure to the visual aspects of engineering design
			822207.3	Exposure to engineering graphics standards
			822207.4	Exposure to solid modeling.
FE	II	English Lab	822208.1	Students will be sensitized towards recognition of English sound pattern.
			822208.2	The fluency in speech will be enhanced.
FE	II	Workshop Practices	822205.1	Students will be able to fabricate components with their own hands.
			822205.2	Get practical knowledge of the dimensional accuracies and dimensional tolerances possible
			822205.3	with different manufacturing processes.
			822205.4	Assemble different components, they will be able to produce small devices of their interest.

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SE	III	Mathematics – III	822301.1	Solve field problems in engineering involving Ordinary differential equations using Laplace Transform.
			822301.2	Apply concept of Fourier and Z-transform to solve field problems in engineering
			822301.3	Formulate and solve problems involving random variables.
			822301.4	Apply statistical methods for analyzing experimental data.
			822301.5	Understand basic concept statistics, probability distribution and test of significance
SE	III	Signals and Systems	822302.1	Demonstrate the ability to represent signals mathematically in continuous time and discrete time, and in frequency domain.
			822302.2	Understand the use of numerical method to analyze digital signal processing.
			822302.3	Understand Discrete Fourier Transform (DFT) and properties.
			822302.4	Analyze discrete time systems using Laplace and Z – transform.
			822302.5	Basic Understanding of state space analysis of system.
SE	III	Analog Electronic Circuits	822303.1	To categorize and calculate the DC and AC parameters of BJT / FET.
			822303.2	To describe and solve the frequency analysis of BJT.
			822303.3	To decide and formulate the various classes of operation of power amplifier.
			822303.4	To predict and classify the different configurations of feedback amplifiers.
			822303.5	To identify and analyze the different open loop and close loop applications of OP-Amp.
SE	III	Discrete Mathematics	822304.1	Formulate the given logic sentence it in terms of predicates, quantifiers, and logical connectives
			822304.2	Formulate real life problems in terms of set theory concepts.
			822304.3	Analyze the solution using deductive logic and prove the solution based on logical inference for given problem
			822304.4	Describe given mathematical problem according to its algebraic structure
			822304.5	Analyze the given problem as graph networks and solve with techniques of graph theory.
SE	III	Organizational Behavior	822305.1	Explain organizationbehaviour
			822305.2	Define individual behavior

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			822305.3	Determine group issues
			822305.4	Apply leadership styles
			822305.5	Analyze factors causing work stress
SE	III	Analog Electronic Circuits Lab	822306.1	To design and formulate the operating point parameters of BJT / FET.
			822306.2	To measure the effect of bypass capacitor in frequency response.
			822306.3	To assess the effect of positive feedback in oscillator.
			822306.4	To test OP-Amp as an integrator and differentiator.
			822306.5	To measure the performance of OP-Amp low pass/ high pass filter
SE	III	Discrete Mathematics Lab	822307.1	Solve the problem based on set theory and logical connectives.
			822307.2	Identify various number conversion techniques.
			822307.3	Apply shortest path techniques in real life.
			822307.4	Analyze minimum spanning tree using Prims and Kruskal algorithm
			822307.5	
SE	III	Object Oriented Programming Lab	822308.1	Create class and object for various application.
			822308.2	Use the concept pointers, constructors, destructors etc. for dynamic memorymanagement techniques.
			822308.3	Apply the concept of inheritance to avoid data duplication.
			822308.4	Create and demonstrate operator overloading.
			822308.5	Implement class and function template.
SE	IV	Biology	822401.1	Describe the concepts of modern cell theories and identify the differences in eukaryotic and prokaryotic cells.
			822401.2	Explain the major groups of animal and plant kingdom.
			822401.3	Demonstrate the advanced techniques in plant and animal tissue culturing, and able to calculate the growth rate of cells through culturing.

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			822401.4	Classify the microorganisms through different isolation techniques and illustrate microbial culture techniques.
			822401.5	Illustrate mechanism involved rDNA technology and apply the different aspects of Biotechnology.
SE	IV	Digital Electronics	822402.1	Develop a digital logic and apply it to solve real life problems.
			822402.2	Understand and use of K-Map and Tabular method for simplification of logical expression.
			822402.3	Analyze, design and implement combinational logic circuits
			822402.4	Analyze and implement the sequential logic circuits using flip-flops.
			822402.5	Classify registers and design of the counters.
SE	IV	Data Structure & Algorithms	822403.1	Enumerate the concepts of data and data structure
			822403.2	Analyze linear data structures
			822403.3	Analyze nonlinear data structure
			822403.4	Enumerate sorting and searching algorithms
			822403.5	Analyze space and time complexity
SE	IV	Computer Organization & Architecture	822404.1	To draw and explain internal architecture of 8086 with its register organization.
			822404.2	Explain various arithmetic and logical 8086 instructions and assembler directives.
			822404.3	Explain single bus architecture within the processor with complete execution cycle.
			822404.4	Explain various types of memories and solve numerical on cache memory design.
			822404.5	Explain and solve arithmetic operations like multiplication using booths algorithm and bit pairing method.
SE	IV	Finance & Accounting	822405.1	Understand the meaning, scope, significance, legal aspects and applications of accounting in Engineering field .
			822405.2	Understanding and use of book-keeping and the distinction of accounting with bookkeeping
			822405.3	Understand and apply Concept Double Entry System, Journal, Ledger for accounting purpose.

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			822405.4	Understand both the theoretical and practical role of financial management in business corporations.
			822405.5	Exposure to primary and secondary markets.
SE	IV	Digital Electronics Lab	822406.1	Generate a logic circuit for Boolean expression using basic gates.
			822406.2	Design a simplified logic circuit using K-Map/ QM method
			822406.3	Create a higher order combinational circuit from lower order combinational circuit
			822406.4	Modify any logic circuit of any type register.
			822406.5	Deploy a counter of any modulus using flip-flops.
SE	IV	Data Structure & Algorithms Lab	822407.1	Evaluate linear data structure
			822407.2	Evaluate inter conversions of mathematical notations
			822407.3	Evaluate Tree traversals
			822407.4	Evaluate nonlinear data structure
			822407.5	Evaluate searching and sorting techniques.
SE	IV	Computer Organization & Architecture Lab	822408.1	Apply DOS/BIOS interrupts and its functions for input and output operations.
			822408.2	Identify and apply 8086 assembly language macro.
			822408.3	Understand and apply 8086 assembly language NEAR and FAR procedure
			822408.4	Apply various string matching operations.
			822408.5	Write program for BCD to HEX conversion and BCD addition
SE	IV	IT Workshop	822409.1	Discuss basics of MATLAB/Scilab open source simulation software
			822409.2	Demonstrate Mathematical operations in MATLAB /Scilab
			822409.3	Illustrate plotting operations on linear expression
			822409.4	Demonstrate relational and logical operations on matrix
			822409.5	Use of matrix manipulation operations



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SE	IV	Environmental Studies	85555.1	Illustrate Natural Resources and associated problems
			85555.2	Outline Ecosystem
			85555.3	Describe Biodiversity
			85555.4	Illustrate Environmental pollution
			85555.5	Illustrate social issues that effect Environment
TE	V	Database Management Systems	822501.1	Explain the basics of Database Management System and develop the entity relationship diagram for any database application.
			822501.2	Construct the queries using Formal Relational Query Languages.
			822501.3	Construct the queries using Structured Query Language and explain the working of Function, Procedure and Triggers.
			822501.4	Identify and apply normalization methods on database, along with understanding of indexing basic concept
			822501.5	Discuss the concept of transaction, concurrency, recovery and various database system architectures.
TE	V	Software Engineering	822502.1	Define basic concepts of software engineering
			822502.2	Describe software requirements
			822502.3	Illustrate the design of software
			822502.4	Test developed software for requirements validation
			822502.5	Outline software project planning activities and schedule them for project execution
TE	V	Formal Language and Automata Theory	822503.1	Understand the basic of formal languages and automata theory.
			822503.2	Describe and transform regular expression for computation.
			822503.3	Construct/convert grammars for formal languages.
			822503.4	Interpret PDA for Context free language and regular language.
			822503.5	Design and analyze the Turing machine for formal languages.
TE	V	E- Commerce (PEC-I)	822544.1	Describe the foundations and importance of E-commerce
			822544.2	Discuss retailing in E-commerce

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			822544.3	Demonstrate the impact of E-commerce on business models and strategy
			822544.4	Categorize Internet trading relationships including Business to Consumer, Business-to-
			822544.5	Assess electronic payment systems.
TE	V	Cyber Law and Ethics (OEC - I)	822553.1	To able to understand the objective and scope of IT act 2000
			822553.2	To get acquainted with the Intellectual Property issues for obtaining the copyright, patents, trademark
			822553.3	To able to get familiar with the procedure of handling the process of Physical security breach
			822553.4	To able to understand the characteristics of Cybercrime and its classification
			822553.5	To be able to classify and understand information security system with respect to threats and attacks.
TE	V	Database Management Systems Lab	822506.1	Develop a database with various constraints using SQL Data Definition Language.
			822506.2	Use DML queries to retrieve, insert, delete and update the database.
			822506.3	Apply various SQL features such as Aggregate functions, Set Operations and Views to resolve the queries.
			822506.4	Demonstrate Stored Procedure, Stored function and Trigger on a Sample Databases.
			822506.5	Develop database application using ODBC/JDBC interface to store and retrieve data from the database.
TE	V	Software Engineering Lab	822507.1	Analyze the type of UML diagrams required for proposed software system
			822507.2	Decide contents of the UML diagrams
			822507.3	Design basic and advanced structural UML modeling diagrams
			822507.4	Design basic and advanced behavioral UML modeling diagrams
			822507.5	Develop various UML models for proposed software
TE	V	Web Programming Language Lab	822508.1	Able to learn new web languages (PHP, JavaScript)

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			822508.2	Make use of appropriate web scripting language for different applications
			822508.3	Install and configure web server
			822508.4	Design interactive website
			822508.5	Design and develop database web application
TE	V	Minor Project (Stage – I)	822509.1	Demonstrate a sound technical knowledge of their selected project topic.
			822509.2	Undertake problem identification, formulation and solution.
			822509.3	Design engineering solutions to complex problems utilizing a systems approach.
			822509.4	Conduct an engineering project
			822509.5	Demonstrate the knowledge, skills and attitudes of a professional engineer.
TE	VI	Operating Systems	822601.1	Discuss fundamental of OS
			822601.2	Solve process scheduling, critical section, concurrency problems.
			822601.3	Explain deadlock & memory management concept.
			822601.4	Describe file management system.
			822601.5	Identify efficient disk scheduling algorithm.
TE	VI	Computer Networks	822602.1	Explain the basics concepts of data communication and networking.
			822602.2	Solve numerical of IP addressing and describe internet protocol along with address mapping.
			822602.3	Describe error reporting and forwarding along with routing protocols.
			822602.4	Demonstrate process to process communication at transport layer using TCP and UDP.
			822602.5	Discuss network security and wireless networking concepts.
TE	VI	Design and Analysis of Algorithms	822603.1	Understand and design of basic algorithms and computer time complexity.
			822603.2	Design and analyze algorithm by Divide and conquer approach.
			822603.3	Apply backtracking and Branch-bound approach to real word problem.
			822603.4	Simulate Greedy and Dynamic programming approach.
			822603.5	Recognize basic computational types of problem

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TE	VI	Embedded System	822642.1	Explain the basic concept of Embedded System
			822642.2	Describe Embedded System Architecture and its communication protocols
			822642.3	Use process of Embedded System Development
			822642.4	Apply concept of ARM architecture
			822642.5	Explain Real Time Operating System.
TE	VI	Project Management	822651.1	Use and explain different stages of project management
			822651.2	Make use of project planning and scheduling tools
			822651.3	Know the methods of cost estimation of project
			822651.4	Apply project risk management for controlling risk
			822651.5	Understand the procurement management for the project
TE	VI	Operating Systems Lab	822606.1	Apply process scheduling concept.
			822606.2	Explain file management & memory management concept.
			822606.3	Discuss concurrency problems.
			822606.4	Analyse the disk scheduling algorithm.
			822606.5	Describe Inter Process Communication mechanism
TE	VI	Computer Networks Lab	822607.1	Apply the concept of bit stuffing in framing.
			822607.2	Use Run Length Encoding for data compression.
			822607.3	Demonstrate client server communication using TCP and UDP Socket.
			822607.4	Develop Cryptographic algorithms.
			822607.5	Build the network scenario in network simulation tool.
TE	VI	Design and Analysis of Algorithms Lab	822608.1	Analyze and Implement divide and conquer approach.
			822608.2	Implement dynamic programming approach
			822608.3	Implement Branch and bounding approach
			822608.4	Implement backtracking approach.
			822608.5	Implement greedy algorithm approach

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TE	VI	Minor Project	822609.1	Demonstrate a sound technical knowledge of their selected project topic.
			822609.2	Undertake problem identification, formulation and solution.
			822609.3	Design engineering solutions to complex problems utilizing a systems approach.
			822609.4	Conduct an engineering project
			822609.5	Demonstrate the knowledge, skills and attitudes of a professional engineer.
BE	VII	Compiler Design	722701.1	Design Lexical Analyzer
			722701.2	Design Syntax Analyzer
			722701.3	Generate Intermediate Code
			722701.4	Illustrate different storage management schemes
			722701.5	Design Code Generator
BE	VII	Machine Learning	722721.1	Recognize the characteristics of machine learning that make it useful to real-world problems.
			722721.2	Able to use regularized regression and Classification algorithms.
			722721.3	Evaluate machine learning algorithms and model selection.
			722721.4	Understand scalable machine learning and machine learning for IoT.
			722721.5	Understand Deep learning and Expert system.
BE	VII	Data Mining	722731.1	To introduce students to the basic concepts and techniques of Data Mining.
			722731.2	To develop skills of using recent data mining software for solving practical problems.
			722731.3	To gain experience of doing independent study and research.
			722731.4	To study the methodology of engineering legacy databases for data warehousing and data mining to derive business rules for decision support systems.
			722731.5	Develop and apply critical thinking, problem-solving, and decision-making skills.
BE	VII	Quantitative Reasoning and Problem Solving	722743.1	Perform arithmetic calculations on number system, HCF and LCM and age
			722743.2	Solve application problems involving Time, Distance, Speed.
			722743.3	Calculate Time Taken at varies case.
			722743.4	Calculate percentage, average and simple interest.

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			722743.5	Classify data as categorical or quantitative.
BE	VII	Compiler Design Lab	722705.1	Demonstrate LEX and YACC tools.
			722705.2	Design Lexical Analyzer.
			722705.3	Design Syntax Analyzer.
			722705.4	Design Code Optimization.
			722705.5	Design Code Generator
BE	VII	Advanced Technology Lab I	722706.1	Break down real world problems / application.
			722706.2	Demonstrate Full Stack development.
			722706.3	Design Full Stack based applications.
			722706.4	Decide tools for Full Stack development.
			722706.5	Develop Full Stack based applications.
BE	VII	Project (Stage – I)	722707.1	Demonstrate a sound technical knowledge of their selected project topic.
			722707.2	Undertake problem identification, formulation and solution.
			722707.3	Design engineering solutions to complex problems utilizing a systems approach.
			722707.4	Conduct an engineering project
			722707.5	Demonstrate the knowledge, skills and attitudes of a professional engineer.
BE	VIII	Cyber Security	822801.1	Determine the act of Cyberoffenses.
			822801.2	Determine the Cybercrime through portable devices.
			822801.3	Determine the methods used in Cybercrime
			822801.4	Determine Phishing and Identity theft
			822801.5	Describe Computer Forensics.
BE	VIII	Soft Computing (Professional Elective Course – V)	822821.1	Apply soft computing methodologies includes neural network.
			822821.2	Apply soft computing methodologies includes fuzzy logic

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			822821.3	Apply soft computing methodologies includes genetic algorithm
			822821.4	Apply soft computing methodologies includes hybrid system
			822821.5	Design of certain scientific and commercial application using soft computing approach
BE	VIII	BlockChain (Professional Elective Course – VI)	822832.1	Understand the structure of a blockchain and why/when it is better than a simple distributed database
			822832.2	Discuss security aspects in blockchain through cryptography
			822832.3	Describe how Cryptocurrency mining works
			822832.4	Write smart contract using Ethereum frameworks and Hyperledger Fabric
			822832.5	Integrate ideas from various domains and develop block chain based solutions
BE	VIII	Logical Reasoning and Problem Solving (Open Elective Course – IV)	822843.1	Tell Analogy, Classification, perform coding and decoding on data
			822843.2	Recognize logical and philosophical reasoning.
			822843.3	Recognize logical reasoning applicable to real-life situations, solve real-life problems
			822843.4	Experience with diversity to demonstrate knowledge and sensitivity.
			822843.5	Solve application problems involving Clock, Calendar and Ratio and Proportion.
BE	VIII	Cyber Security Lab	822805.1	To describe Information Technology Act of India.
			822805.2	Describe Cyber Security
			822805.3	Demonstrate Offensive Cyber Security Tools
			822805.4	Demonstrate Defensive Cyber Security Tools
			822805.5	Demonstrate Security Testing Tools for Web Applications.
BE	VIII	Advanced Technology Lab II	822806.1	Break down real world problems / application.
			822806.2	Demonstrate Full Stack development
			822806.3	Design Full Stack based applications

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			822806.4	Decide tools for Full Stack development
			822806.5	Develop Full Stack based applications.
BE	VIII	Project	822807.1	Demonstrate a sound technical knowledge of their selected project topic.
			822807.2	Undertake problem identification, formulation and solution.
			822807.3	Design engineering solutions to complex problems utilizing a systems approach.
			822807.4	Design engineering solutions to complex problems utilizing a systems approach.
			822807.5	Demonstrate the knowledge, skills and attitudes of a professional engineer.